Heating & Air Conditioning
Amana®
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RCC/RCE
Remote Cooling Condensing Units
Installation Instructions

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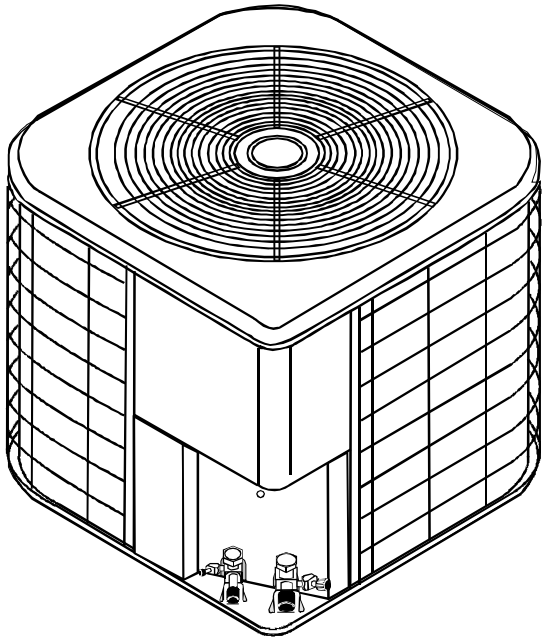

⚠ RECOGNIZE THIS SYMBOL AS A SAFETY PRECAUTION.

ATTENTION INSTALLING PERSONNEL

As a professional installer you have an obligation to know the product better than the customer. This includes all safety precautions and related items.

Prior to actual installation, thoroughly familiarize yourself with this Instruction Manual. Pay special attention to all safety warnings. Often during installation or repair it is possible to place yourself in a position which is more hazardous than when the unit is in operation.

Remember, it is your responsibility to install the product safely and to know it well enough to be able to instruct a customer in its safe use.

Safety is a matter of common sense...a matter of thinking before acting. Most dealers have a list of specific good safety practices...follow them.

The precautions listed in this Installation Manual are intended as supplemental to existing practices. However, if there is a direct conflict between existing practices and the content of this manual, the precautions listed here take precedence.

Amana
1810 Wilson Parkway • Fayetteville, TN 37334

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Safety Instructions

RECOGNIZE SAFETY SYMBOLS, WORDS, AND LABELS

The following symbols and labels are used throughout this manual to indicate immediate or potential safety hazards. It is the owner's and installer's responsibility to read and comply with all safety information and instructions accompanying these symbols. Failure to heed safety information increases the risk of personal injury, property damage, and/or product damage.

⚠ WARNING

WARNING - Hazards or unsafe practices which COULD result in severe personal injury or death.

⚠ CAUTION

CAUTION - Hazards or unsafe practices which COULD result in minor or moderate personal injury, product damage, property damage.

⚠ WARNING

To avoid personal injury, shock, or death, ensure the electrical disconnect switch(es) is (are) in the OFF position before installing, modifying, or servicing the unit. Lock out and tag the switch with a suitable warning label. Wiring must conform with NEC or CEC and all local codes.

Safety Guidelines

1. Allow only qualified, experienced technicians to install or service this unit.
2. Install the system in accordance with all local codes. If no local codes exist, follow National Codes (NEC in the U.S., CEC in Canada).
3. Open the electrical disconnect switch(es) before electrically connecting the unit.
4. Before operating the unit, be certain it is properly grounded.
5. The unit contains refrigerant gas under pressure. Avoid puncturing or breaking any tubing.
6. Before operating the unit, complete the refrigerant connections.

General

This manual covers only the installation of the remote cooling unit. For information on accessories, see the unit "Specification Sheet".

SHIPPING AND HANDLING

Units are securely packed in shipping containers approved by the International Safe Transit Association. Check the carton upon arrival for external damage. If damage is found, file a request in writing for inspection by the carrier agent immediately. The carrier is responsible for making prompt inspection of damage and for a thorough investigation of each claim. The distributor or manufacturer will not accept claims from dealers for transportation damage. If no damage is found, carefully remove all shipping material and properly dispose of it.

Keep the unit as upright as possible. Laying the unit on its side or top could cause equipment damage.

LOCATION AND CLEARANCES

This unit is for outdoor installation only. Refer to Figure 1 for clearances from the sides of the unit to full walls and other objects.

This unit is for outdoor installation only. The unit cannot be completely enclosed. At least one side must be unrestricted. Refer to Figure 1 for clearances from the sides and top of the unit to walls and other objects.

NOTE: These minimum clearances do not guarantee adequate service access. Sufficient clearances for servicing the unit(s) must be provided.

If installing two or more units at the same location, allow at least 24 inches between the units when using the 6"-12"-12" guidelines in Figure 1. The space between two units may be reduced to 12" if the clearances in Figure 1 are increased to 12"-24"-24".

MINIMUM CLEARANCES

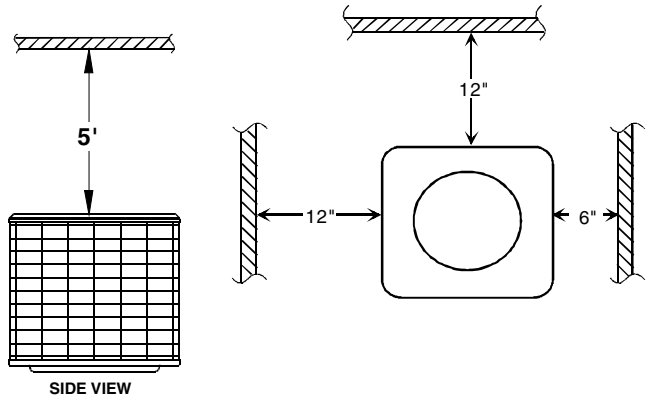


Figure 1

DO NOT locate the unit:

- —Directly under a vent termination for a gas appliance.
- —Within 3 feet of a clothes drier vent.
- —Where water may rise into the unit.
- – Where the noise would prove to be a nuisance to the customer (i.e. windows, patios, decks, etc.)

DO locate the unit:

- —In accordance with the minimum clearances described in Figure 1.
- —To minimize the length of refrigerant piping required.
- —To provide adequate service clearances.
- —On a level concrete pad (or other sturdy, weather resistant platform).
- —Isolated from the building structure to avoid transmission of vibrations.

NOTE: Short runs of refrigerant piping are better than long runs. Locate the unit to provide safe access for future maintenance and service. If possible, discuss unit location with the owner before proceeding.

ROOFTOP INSTALLATIONS

Before installing this unit on a roof, ensure that the roof will support the weight of the unit, its platform, and the service personnel. For the unit weight, see the outdoor unit specification sheet (all weights are approximate). If there is doubt about the adequacy of the roof, contact a qualified architect or structural engineer before installing the unit. Ensure the unit is placed on a level, weather-resistant platform.

APPLICATION NOTE

For proper performance, the indoor equipment and ductwork must be adequate for moving about 400 CFM of indoor air for every ton of cooling capacity to be installed. If they are not, modify the ductwork or indoor equipment accordingly.

Refrigeration Piping

REFRIGERANT VAPOR AND LIQUID LINE SIZING

See unit "Specification Sheet" for the required vapor and liquid line tubing sizes. The listed sizes in the specification sheet are suitable for line lengths of fifty feet or less and indoor coil elevations of no more than forty feet above or below the outdoor unit. **NOTE:** Unit performance is affected by vapor line tubing size. A larger than required vapor line tubing inhibits oil return to the unit. A smaller than required vapor line tubing size decreases unit performance by up to 10%. If a run of more than fifty feet is required, contact your Amana distributor for assistance.

Check the indoor coil liquid and vapor line diameter. A bushing or coupling may be needed to match with the line sizes used. If mix-matching to a restrictor orifice indoor coil, check the "Specification Sheet" for the proper orifice size to be used with this outdoor unit. Piston orifices are supplied with the outdoor unit.

REFRIGERANT VAPOR AND LIQUID LINE ROUTING

All of the vapor line must be insulated. The insulation must include a vapor barrier.

The unit liquid line must be outside the vapor line insulation. If any part of the liquid line runs through an area that will be hotter than 120°F, that part must be insulated.

Avoid burying refrigerant lines. If you must bury them, first dig the trench so that it gradually slopes toward the compressor (at least 1 inch per 10 feet). Then, insulate the liquid and suction lines separately. Enclose all underground portions of the refrigerant lines in waterproof material (conduit or pipe). If the lines must pass under or through a concrete slab, be sure they are adequately protected.

- Seal the holes where the refrigerant piping enters the building and support piping as necessary.
- Be careful not to kink or dent the refrigerant lines. Kinked or dented lines will cause poor performance or compressor damage.

FILTER DRIER INSTALLATION

⚠ CAUTION

To prevent damage to the unit, a bi-flow filter drier must be installed in the liquid line.

Install the supplied bi-flow line filter drier near the condensing unit or near the indoor coil. A new filter drier (properly sized and rated for R-22) MUST be installed with new outdoor units in order for the compressor warranty to remain valid. Any time the refrigeration system has been opened for service, a new properly-sized bi-flow filter drier rated for R-22 must be installed.

SWEAT CONNECTIONS AT THE UNIT

NOTE: When brazing, use a brazing alloy of 2% minimum silver content. Do not use flux.

Before brazing connections, ensure the refrigerant line ends are cut square, deburred, cleaned, free of nicks or dents and round. Any other condition would increase the chance of refrigerant leakage.

During brazing, wrap the component with a wet rag, or use a thermal heat trap compound as directed by the compound manufacturer, to avoid overheating the service valve, TXV valve, or filter drier while brazing.

After brazing, quench the joints with water or a wet cloth to prevent overheating of components. Inspect the paint finish of the filter drier. If the paint of the steel filter drier has been burned or chipped, repaint or treat with a rust preventative. This is especially important on suction line filter driers which are continually wet during the unit operation.

Safe Refrigerant Handling

⚠ WARNING

To avoid possible explosion, death, or injury, practice safe handling of refrigerants.

NOTE: While these items will not cover every conceivable situation, they should serve as a useful guide.

⚠ WARNING

Refrigerants are heavier than air. They can "push out" the oxygen in your lungs or in any enclosed space. To avoid possible death or difficulty in breathing:

- **Never sniff a refrigerant.**
- **Never purge refrigerant into an enclosed room or space. In fact, all refrigerants must, BY LAW, be reclaimed.**
- **If an indoor leak is suspected, thoroughly ventilate the area before beginning work.**
- **Liquid refrigerant can be very cold. To avoid possible frostbite or blindness, avoid contact and wear gloves and goggles. If liquid refrigerant does contact your skin or eyes, get medical help immediately.**
- **Always follow EPA regulations. Never burn refrigerant, as poisonous gas will be produced.**

WARNING

To avoid possible explosion:

- **Never apply flame or steam to a refrigerant cylinder. If you must heat a cylinder for faster charging, partially immerse it in warm water.**
- **Never fill a cylinder more than 80% full of liquid refrigerant.**
- **Never add anything other than R-22 to an R-22 cylinder.**
- **Store cylinders in a cool, dry place. Never use a cylinder as a platform or a roller.**

WARNING

To avoid possible explosion, use only returnable (not disposable) service cylinders when removing refrigerant from a system.

- **Ensure the cylinder is free of damage which could lead to a leak or explosion.**
- **Ensure the hydrostatic test date does not exceed 5 years.**
- **Ensure the pressure rating does not exceed 400 lbs.**

LEAK TESTING

WARNING

To avoid the risk of fire or explosion, never use oxygen, high pressure air or flammable gasses for leak testing of a refrigeration system.

1. Before testing, ensure both hand valves on the gauge manifold are closed relative to the center port (i.e., turned IN all the way.)
2. Attach the gauge manifold to the service valves on the unit (see Figure 2).

   Do not open the unit service valves.

   Do not use refrigerant from the unit for leak testing. The refrigerant in your unit has been precisely measured at the factory for optimum performance.
3. Connect a cylinder of dry nitrogen to the center port on the gauge manifold.

WARNING

To avoid possible explosion, the line from the nitrogen cylinder must include a pressure regulator and a pressure relief valve. The pressure relief valve must be set to open at no more than 150 psig.

4. Open the hand valve a minimal amount on the line coming from the nitrogen cylinder.
5. Open the high pressure valve on the manifold gauge. Pressurize the refrigerant lines and the indoor coil to 150 psig (1034 kPA). To reach 150 psig, you may need to further open the hand valve on the nitrogen cylinder.

WARNING

To avoid possible explosion or equipment damage, do not exceed 150 psig when pressure testing.

6. Close the valve on the nitrogen cylinder and disconnect it from the gauge manifold.
7. Check for leaks. Apply a soap solution on all connections and joints. If you see bubbles, you have a leak. Mark these locations.

NOTE: If you use an electronic leak detector to test for leaks, add a trace of R-22 to the system (if permitted by current EPA regulations) before testing.

8. Using the gauge manifold, carefully release the nitrogen from the system. If leaks are found, repair them. After repair, repeat the above pressure test. If no leaks exist, proceed to *ID Coil and Line Sets Evacuation*.

ID COIL AND LINE SETS EVACUATION

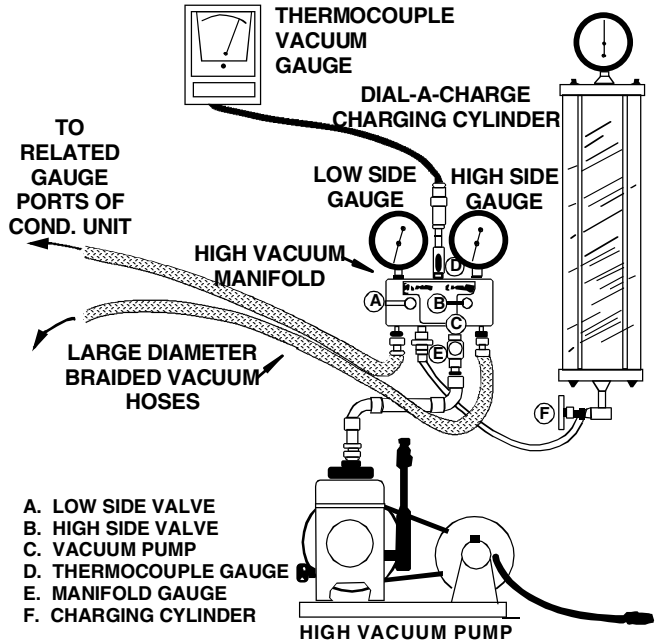


Figure 2

Step 1. Confirm Proper Pump And Gauge Operation

a. Connect vacuum pump, gauge manifold set, vacuum gauge and charging cylinder to unit service valves as shown in Figure 2. Ensure all manifold valves are fully closed.

b. Open the shutoff valve leading to the vacuum pump (Figure 2) (C), start the pump, and watch the gauge manifold. The readings in the gauge manifold should drop to approximately 29 inches Hg. If this does not happen, there is probably a leak in the pump and gauge system. Repair the leak and test again.

c. Open the vacuum gauge valve (D) and evacuate to 250 microns or less. If the system cannot be evacuated, replace the vacuum pump equipment and repeat steps (a) through (c) again. Otherwise, the pump and gauge are operating properly and you can continue on to the next step; evacuating the system. Before proceeding, be sure to close the valve to the vacuum gauge to avoid "pegging the meter" and potential gauge damage.

Step 2. Evacuate Lines And Indoor Coil.

a. Open the high and low side valves (B & A) on the gauge manifold. **NOTE:** Only open the valve (E) on the gauge manifold leading to the cylinder, not the valve on the charging cylinder (F).

b. Evacuate the system to about 29 inches Hg as measured by the low side gauge.

c. Open the valve (D) to the vacuum gauge. Evacuate until the gauge reads 250 microns or less.

d. Close the valve to the vacuum pump (C). Wait five minutes, then check the pressure on the vacuum gauge:

1. If the pressure is not more than 1500 microns, the system is leak-free and properly evacuated. Proceed to step (e).
2. If the pressure rises, but holds at about 5000 microns, moisture and noncondensibles are still present. Open the valve to the vacuum pump (E), and go back to step (c).
3. If the pressure rises above 5000 microns, a leak is present. Go back to "Leak Testing" section on page 5.

e. Close the valve to the vacuum gauge.

f. Close the valve to the vacuum pump. Shut off the pump.

Electrical Connections

WARNING

To avoid personal injury, shock, or death, open the electrical disconnect switch before electrically connecting the unit. Wiring must conform with National Electrical Code (NEC) or Canadian Electrical Code (CEC) and all local codes.

The wiring diagram for this unit can be found on the control box door. Refer to Figure 4 for field wiring connections.

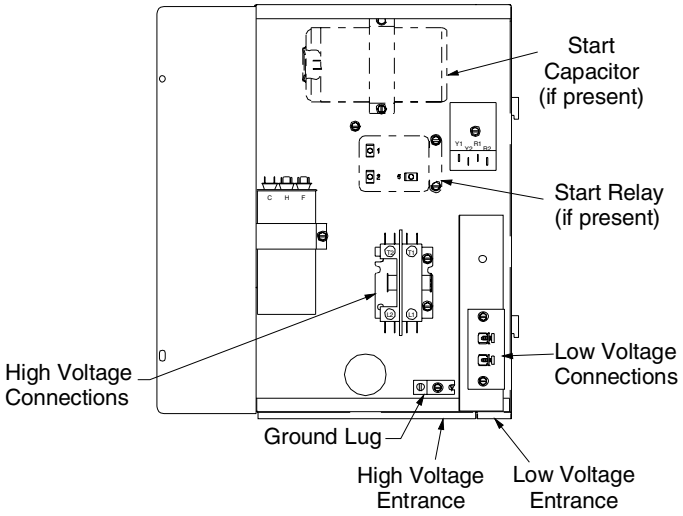


Figure 3

WARNING

To avoid the risk of fire or equipment damage, use only copper conductors.

WARNING

Undersized wires could cause poor equipment performance, equipment damage, or fire. Consult the National Electrical Code or a qualified electrician for proper wire size.

WARNING

To avoid electrical shock, injury, or death, wiring to the unit must be properly grounded.

Wire size is important to ensure proper unit operation. The size must be sufficient to carry the minimum circuit ampacity listed on the unit serial data plate. Amana recommends sizing the wires to limit the voltage drop to a maximum of 2% from the main breaker or fuse panel to the outdoor unit. Consult the NEC, CEC, and all local codes to determine the

correct wire gauge and necessary length of run for proper wiring.

1. Route the power supply and ground wires through the high voltage entrance in the unit. Connect the power supply wires to the contactor. Connect the ground wire to the ground lug.
2. Route the low voltage wiring through the low voltage entrance in the unit. Connect the low voltage wires to the terminal strip.
3. If an Amana approved room thermostat is not already present, install one at a suitable indoor location. Consult the instructions packaged with the thermostat for mounting and location instructions. For field-supplied low voltage wiring and connections, see the last section of this manual.
4. Check all factory wiring connections to ensure none were loosened during shipping and handling.

A fan relay and/or a 40VA transformer may have to be added to prepare some indoor furnaces for cooling operation. For proper cooling performance, the indoor equipment and ductwork must be adequate for moving about 400 CFM of indoor air for every ton of cooling capacity to be installed. If they are not, modify the ductwork or indoor equipment accordingly.

IMPORTANT: Hard start components are required when single-phase reciprocating compressors are used with indoor coils which have thermal expansion valves. Some units have hard start components factory installed. See the "Specification Sheet" for hard start component requirements.

5. Check all factory wiring connections to ensure none were loosened during shipping and handling.

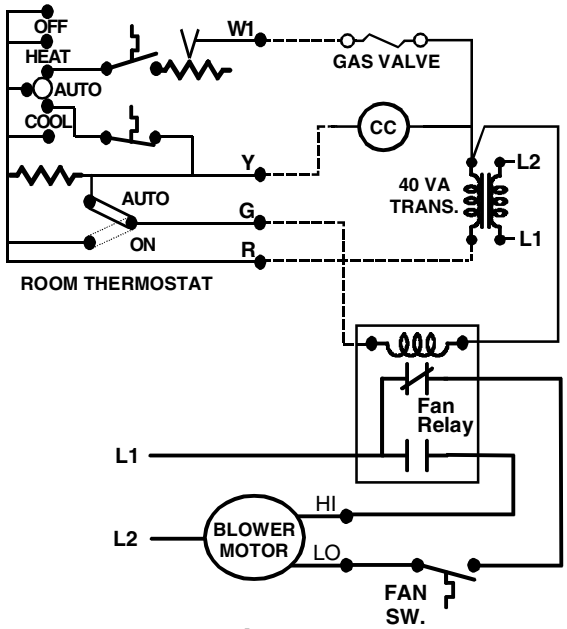


Figure 4

System Startup

IMPORTANT!

During all installation and service work, follow all regulations of the Environmental Protection Agency (EPA). This system uses refrigerant R-22. R-22 is an HCFC (HydroChloro-FluoroCarbon). It is a violation of EPA regulations to discharge HCFC into the atmosphere and doing so may result in fines or other penalties.

After completing system piping, leak testing, and electrical connections, use an male hex head wrench to open the suction and liquid valves on the unit.

These valves do not backseat. OPEN EACH VALVE ONLY UNTIL IT TOUCHES THE RETAINER. TO AVOID LOSS OF REFRIGERANT, DO NOT APPLY PRESSURE TO THE RETAINER.

The outdoor unit is factory-charged with enough R-22 for the matching indoor blower coil or matching A-coil **plus** 25 feet of 3/8" liquid line. For liquid line lengths greater than 25 feet, add 0.55 oz. of R-22 per additional foot up to 50 feet. For line sets over 50 feet consult an Amana distributor. For liquid line lengths less than 25 feet, subtract 0.55 oz. of R-22 per deviating foot.

⚠ CAUTION

Using refrigerant that does not meet ARI Standard 700 may cause compressor damage and void the warranty.

IMPORTANT: If adding additional refrigerant to a system, add only refrigerant vapor (not liquid) through the suction valve (low side) on the outdoor unit. Any other practice may cause compressor damage.

FINAL CHARGE ADJUSTMENT

Matching System
This final charge adjustment procedure is for the matched combination listed on the specification sheet.

If the outdoor temperature is 60°F or higher, set the room thermostat to COOL, fan switch to AUTO, and set the temperature control well below room temperature.

If the outdoor temperature is below 60°F and you are installing a **matching system**, set the room thermostat to HEAT, fan switch to AUTO, and set the temperature control well above room temperature.

Turn the electrical power ON, and let the system run for several minutes. It will take some time for the refrigerant pressures to stabilize.

Compare the operating pressures and outdoor unit amp draw to the numbers listed in the outdoor unit "Specification Sheet". If pressures and amp draw are too low, add charge.

If pressures and amp draw are too high, remove charge.

If you are not using the “Matched Combination” which is listed on the unit "Specification Sheet", check subcooling (TEV coils) or superheat (flowrator coils) as detailed below.

AMANA-Approved Mix-Matched System Combinations
Use Amana expanded performance multiplier tables in addition to the following procedures.

INDOOR COIL WITH EXPANSION VALVE

At stabilized cooling conditions and with an outdoor temperature of 60°F or higher, the subcooling at the outdoor unit liquid line service valve should be as specified in the specification sheet. Add or remove charge as required.

INDOOR COIL WITH ORIFICE

For a proper superheat reading, measure the refrigerant pressure and temperature at the outdoor unit vapor line service valve. The superheat should be within 3°F of that shown on the *Desired Superheat vs Outdoor Temperature* chart (*page 9)*. If the superheat is higher, add charge. If the superheat is lower, remove charge.

EXAMPLE: The low side pressure is 84 psi. The low side temperature is 80°F. The outdoor temperature is 95°F. The indoor temperature is 85°F. By referring to a pressure temperature chart, you will see that 84 psi equals a saturated temperature of 50°F. The superheat is 80 - 50 = 30°F. The chart shows a superheat of 20°F is ideal for these conditions. Since our superheat is 30 - 20 = 10°F higher than ideal, charge must be added.

If the system is performing properly, reinstall the service port caps and the valve bonnets. With the valve opened, the valve bonnet is the primary seal against refrigerant leaks. See the table below for the torque required for an effective seal on the valve bonnet (1/6 turn past finger tight).

Tubing Size	Torque (Foot-Pounds)
3/8	10
1/2, 5/8, 3/4	14
7/8, 1 1/8	16

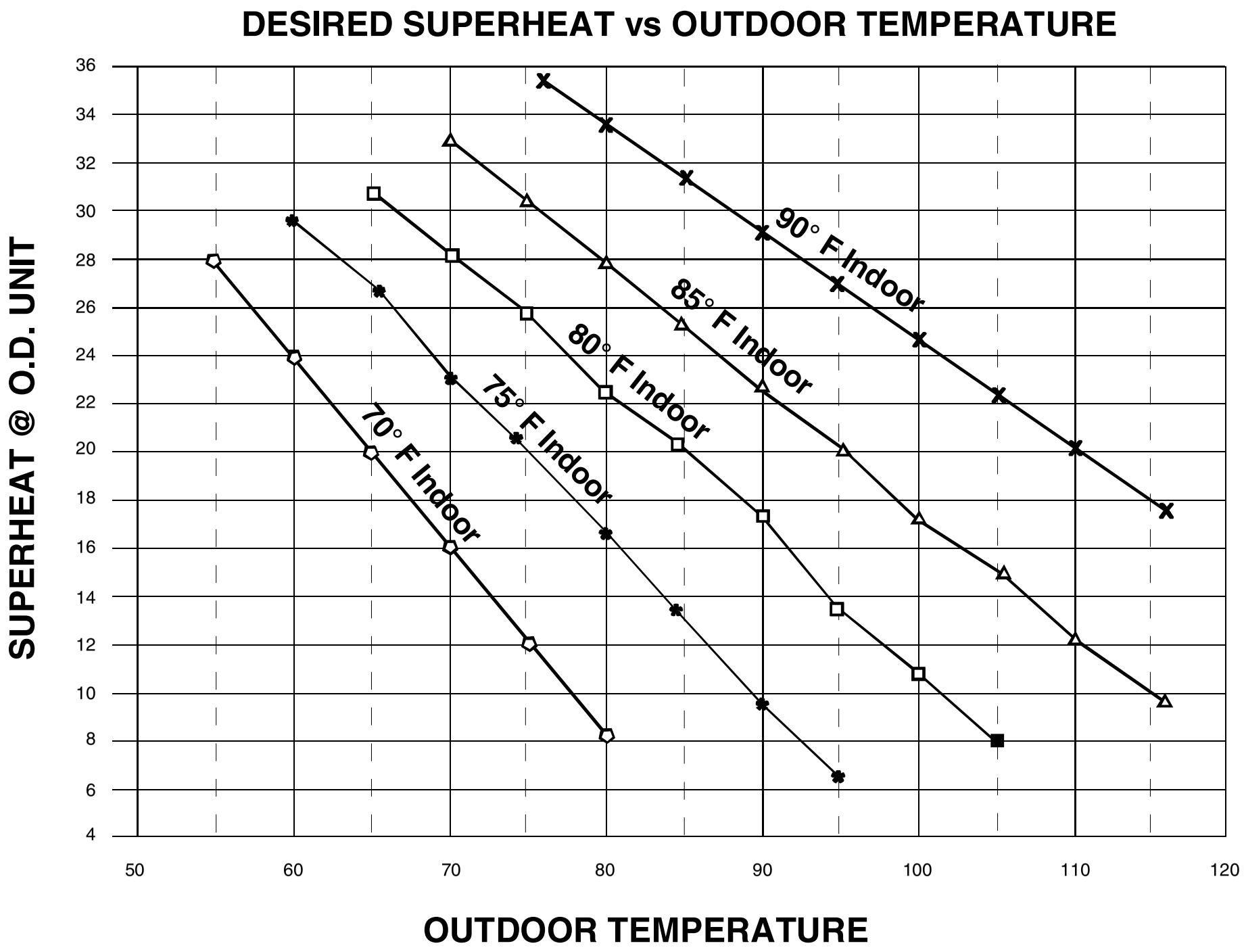
After closing the valve bonnet, perform a final refrigerant leak test on the valves and sweat connections. Return the room thermostat to the desired settings.

Troubleshooting

(QUALIFIED SERVICER ONLY)

When troubleshooting, the first step should always be to check for clean coils, clean filter(s), and proper airflow. Indoor airflow should be 350 to 450 CFM per ton of cooling, based on the size of the outdoor unit.

If further information is needed, see the Remote Cooling Service Manual.


DESIRED SUPERHEAT vs OUTDOOR TEMPERATURE
SUPERHEAT @ O.D. UNIT
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
50
60
70
80
90
100
110
120
OUTDOOR TEMPERATURE
90° F Indoor
85° F Indoor
80° F Indoor
75° F Indoor
70° F Indoor

System Checklist

	1	Does the condenser fan blade rotate freely, and is it tight on the shaft?
	2	Does the refrigerant tubing flex freely and not touch another tube to cause rub through?
	3	Are both indoor and outdoor sections level?
	4	Are the units properly supported?
	5	Is outdoor section properly located on concrete base or equivalent?
	6	Are the refrigerant lines correctly installed according to the relative position of the outdoor and indoor sections?
	7	Is the refrigerant tubing properly supported by isolation hangers?
	8	Is the system completely free of refrigerant leaks?
	9	Has the system been properly evacuated?
	10	Does the system have the correct refrigerant charge?
	11	Is the outdoor unit protected by the correct size time delay type fuses or breakers in the indoor power box?
	12	Are the power supply wires to units the correct size?
	13	Are all electrical connections tight?
	14	Does the compressor sound normal?
	15	Check the amperage on the indoor blower motor. Is it within the limits shown on the nameplate of the motor?
	16	Are all access panels installed and secured?
	17	Do controls function properly? Are manual reset switches in the reset position (high pressure cutouts, relays, etc.)?
	18	Check the voltage with unit running. Does it check within the tolerance of 207 to 253V for 230V, or 198 to 228V? If using 208V power indoors, have you modified the transformer wiring as necessary?
	19	Has the air flow across the indoor coil been checked and adjusted?
	20	Has the air distribution system been balanced? Are all grilles, diffusers, and dampers properly adjusted and locked?
	21	Has the system operated at least 30 minutes before leaving the job?
	22	Does the owner understand the operation of the unit and the thermostat?
	23	Does the owner know where the filters are located?
	24	Does the owner know when and how the filter(s) should be cleaned or changed?
	25	Have the registration cards been filled out and mailed?
	26	Does the owner know whom to call for service?
	27	Has the User's Guide been filled out and left with the owner?